

Chapter 2: Software

Meridian IVR software requirements

For developing and running applications, Meridian IVR requires the following software components:

- Meridian Mail Voice Processing software with ACCESS Enable option
- Meridian IVR System Voice Prompts
- Meridian IVR software

All systems include the following:

- Run-Time software
- SCO UNIX operating system

Development systems include the following:

- Application editor software
- SCO UNIX development option

Notes:

- 1** A minimum of Meridian Mail Release 8 software is necessary to run ACCESS and Meridian IVR.
- 2** Meridian IVR uses the Meridian ACCESS toolkit to interface to the Meridian Mail Voice Processing platform.

Meridian ACCESS (NTP 555-7001-31X) and *Meridian Mail* (NTP 555-7001-XXX) software are covered in standard NTP documents and are not repeated in this document.

The Application Editor

The Application Editor is one of the key software components of Meridian IVR. The Application Editor allows Meridian IVR users to customize their IVR applications for specific uses.

The Application Editor provides the various facilities necessary to develop and deploy voice and fax applications. This section describes the Application Editor, its major components, and its functionality. Those items which have been added specifically for Meridian IVR Release 2.0/I are highlighted.

The Application Editor is specifically designed to address several critical customer needs:

- development of voice processing applications through a graphical, user-friendly interface without impacting existing applications
- compliance with established network switching standards
- cost-effectiveness over a broad range of applications solutions
- modular architecture allowing the integration of future enhancements without impacting existing applications
- scalability and manageability

The Application Editor with its graphical user interface (GUI) is user-friendly, reducing the need for the application developer to write code in a traditional programming language. Applications are developed by selecting cells from the cell palette and joining them together.

For each cell type, parameters are available to specify exactly how the cell performs its functions. With this approach to application building, the developer picks an action, optionally adjusts modifiers associated with the action, and then makes the logical connections between the actions to complete the application.

If the developer requires functions that are not available through the cells, user functions can be written in the "C" programming language to provide the specialized functionality.

**CAUTION****Risk of system problems**

Development of "C" language code on a live system is not advisable as it is very powerful and can be potentially dangerous if poorly written.

Application concepts

An application consists of a collection of cells that are stored in a file. An application controls the activity on one or more telephone lines connected to the Meridian IVR and can perform activities such as the following:

- Answer a telephone call.
- Play recordings to a caller.
- Ask a caller to leave information by pressing Touch-Tone keys.
- Record and store messages from callers.
- Make outgoing telephone calls.
- Connect a caller with an operator.
- Perform math operations.
- Connect a caller with equipment outside the system, such as a paging terminal.
- Schedule message-delivery applications to be run at a later time.
- Send/Receive information from a 5250- or 3270-based IBM host application.
- Send/Receive information to a host application through VT100 emulation.
- Store, retrieve, and update data in a local or remote SQL database.
- Send/Receive faxes.
- Incorporate custom user functions.

Such applications can be created and modified on-line, and new versions of the application may be introduced on-line without closing down current calls.

The basic components needed to build an application are described in the following sections.

Cells and underlying structure

Cells are the building blocks of every application. Each cell performs a defined action and then determines which cell will be executed next. Various cell types are available to the application developer.

The cell type designates the functions that the cell will perform; for example, the “Play Prompt” cell type plays a series of voice prompts to the caller. For each cell type, the application developer defines the parameters to specify exactly how the cell will perform its functions (for example, the number of prompts to be played and the identification of each prompt).

The categories of cell types that make up the basic building blocks of applications are

- application execution
- application scheduling
- audiotext
- call management
- data manipulation
- fax response
- host communication
- local database
- messages
- multilingual
- outdialing
- SQL data base
- user function

In an application, control flow is determined at the cell level. The application begins with the designated first cell and branches from there. Each cell type has its own set of pathways to the next cell. Each time the cell is executed, it decides which pathway to take depending on the conditions.

Types and categories

There are 58 different types of cells that are grouped into 13 categories. Each category of cells has its own icon under which the specific cell types are listed.

Parameters

Each cell has parameters that permit the developer to fine-tune the way the system operates. There are default parameters that are used if the developer does not define a parameter.

Examples of some parameters for the MENU cell are as follows:

- the number of prompts that may be played
- the number of possible valid inputs
- the list of invalid input retries allowed
- the time-out interval when no input is received

Buffers

Each cell has buffers for storing information. Buffer values are on a per call basis. These can be used to store any information that will be used by the cell, or for storing the data collected by the cell operation such as calling and called telephone numbers, passwords, user inputs, mailbox IDs, and so on. Users can also create up to 50 customized buffers per application.

Tables

Each cell can also establish a set of tables. For instance, there is a table for Valid Inputs in a MENU Cell. This table defines the valid inputs and the next cell to which the caller is directed. There is also a Play Prompt Table for the cells that list the prompt numbers that are to be played.

Basic telephony functions

The following basic telephony functions are supported by Meridian IVR:

- initiate a telephone call
- answer a call
- add on call (conference)
- transfer (supervised)
- transfer (blind)
- reconnect to held call
- generate Dual Tone Multi-Frequency (DTMF) (0-9, A-D)
- disconnect a call

Call information

A number of data buffers are available to the application for storing information and passing it between cells. These buffers permit applications to make use of call information such as calling number and called number.

The buffers are maintained separately for each call. There is also a set of system buffers that are the same for every application. Additionally, the application developer can define user buffers that are particular to an application as required.

Coordinated Call Transfer to ACD

The Coordinated Call Transfer feature allows an IVR application to transfer a caller from an IVR session to an ACD agent queue. It monitors the call to determine the exact agent's set that answered the transferred call, and passes IVR session information to a host application so that the host application can send a screen of data to the agent.

This functionality requires coordination with the host application and, therefore, requires customization based upon each customer's particular host application. This requires a small amount of customization by the developer of the basic functions of the cells which are provided on the palette.

Coordinated Call Transfer functionality is provided through use of a predefined user function. In other words, the capability is preprogrammed in such a way that a small amount of customization is required by the application developer. This predefined user function is programmed with the majority of functionality required; however, it requires that the application developer add the data that is unique to the host application.

Call progress detection

Meridian IVR uses Meridian Mail's Digital Signal Processing (DSP) to detect the following call progress states:

No Answer

The call was not answered.

Answer

The call was answered (Miscellaneous).

Voice

The call was answered by Voice.

Short

The call was answered by Short Silence.

Long

The call was answered by Long Silence.

Pager

The call was answered by Pager.

SIT

The call was answered by SIT Tone.

Notes:

- 1** A *short* silence indicates that a ringback was detected and the call was answered, but no sound energy was detected within five seconds of the call being answered.
- 2** A *long* silence indicates that no ringback was detected, but the call was answered. No sound energy was detected within a fairly long time period (approximately 27 seconds).
- 3** There is currently no way to detect when a call is answered by an answering machine.

In addition, Meridian IVR uses signaling from the Meridian 1 to detect disconnect.

Fax response

Meridian IVR applications can be developed to send and receive faxes using the fax cells which are new for release 2.0/I.

These fax cells provide a Meridian IVR application developer with the following fax functions:

Fax Send

Either send a same call fax on the fax modem previously requested by Fax Request, or queue a Callback Fax for subsequent transmission.

Fax Receive

Receive a same call fax on the fax modem previously requested by Fax Request.

In addition, a Meridian IVR application developer will be able to

- define a fax document as one or more pages, each page consisting of overlaid and/or concatenated ASCII, Postscript, and TIFF data
- create fax documents using any UNIX editor (such as “vi”), or build a document at run-time using the data concatenation user function
- convert a generic document file into a pure fax file
- print a pure fax document on the system laser printer
- submit a pure fax document into the Callback queue for subsequent transmission
- preview fax documents before using them

Transaction messaging

It is often useful to record messages from callers during an IVR session. For example, it may be necessary to record a caller’s name and address in order to send requested material. These messages can be deposited into a mailbox and later retrieved for processing.

Meridian IVR provides cells to record, play, and delete voice messages during a single interactive session. The ability to address and send a Meridian Mail message is provided through these cells. (This requires Meridian Mail Release 8.29 or above or Release 9.58 or above.)

Administration

The system configuration facility is used to configure system parameters such as the number and types of voice channels and range of voice prompts.

Administrators can also perform top-level application management such as loading and unloading applications, starting and stopping applications, reassigning voice channels, and bringing new applications on-line.

Monitoring facilities are provided to indicate which voice channels are currently active and to show any outstanding alarms.

System prompts

System prompts required for Meridian IVR are provided in US English and Canadian French. This library of prompts consists of commonly used words and phrases. This allows the application developer to build and test the applications prior to recording the final prompts.

A Meridian Mail tape containing these system prompts is included with the Meridian IVR software. The system prompts must be installed on the customer's Meridian Mail system by using the Voice Prompt Transfer Tool on Meridian Mail.

Voice prompt loading and editing

The Voice Prompt Editor (VPE) is used to provide recording and editing of additional application voice prompts. New voice prompts can also be recorded to replace the old voice prompts.

Note: System prompts and application prompts should be rerecorded to maintain a common voice, although the wording of the system prompts should not change.

The Voice Prompt Editor is optional on a Run-Time system.

Local database

An information database is included as part of Meridian IVR. This database consists of a series of records that are accessed by a number (such as a phone number. Each record contains up to 10 fields of information).

Information databases have many uses such as determining which application to run based upon calling number and called number or which prompts to play based upon specific user input. These databases can be updated by either the System Administrator or by an application. The local Database Editor is optional on a Run-Time system.

SQL database

Meridian IVR Release 2.0/I provides support for local and remote relational databases. The SQL cells provided with Meridian IVR Release 2.0/I make it possible to interface into local or remotely located Informix, Oracle, Ingres, or Sybase databases.

The SQL database interface software is an optional package which is only included if purchased by the customer.

Notes:

- 1 Meridian IVR Release 2.0/I provides access to the local Informix, Oracle, Ingres, or Sybase databases but does not provide the actual database.
- 2 Informix, Oracle, Ingres, and Sybase options are mutually exclusive and may not be installed together on the same system.
- 3 Remote SQL databases are supported through Meridian IVR cells. Network software must be provided for each database.

Host connectivity

Meridian IVR Release 2.0/I supports host connectivity for IBM 3270/5250 and VT100 interfaces. By emulating an operator providing input and/or retrieving output from a 3270/5250 or VT100 session, Meridian IVR applications can easily access required information that is normally displayed on the terminal screen.

Host connectivity is provided in two ways:

- Host connectivity through cells provided with Meridian IVR
 - 3270/SNA (including 3274, 3278, 3279)
 - 5250/SNA
 - 3270 over Token Ring
 - VT100 emulation over serial ports
 - 5250 over Token Ring
- Host Connectivity through custom user functions, for example:
 - Token Ring and Ethernet
 - IBM 3270 over X.25
 - Standard RS-232 Serial Interface

3270 SNA connectivity

A category of cells supports IBM 3270 SNA host connectivity. By emulating an operator providing input to and/or retrieving output from a 3270 session, the Meridian IVR application can easily access required information that is normally displayed on the terminal screen.

The application developer provides screen templates that define the location of input and output fields on the terminal screen. This is accomplished either through row and column offset or through a unique field identifier that serves as a tag to identify the field.

The application developer also provides action templates that connect the screen templates into a logical transaction that must be traversed in order to accomplish the desired action. This emulates actions such as a terminal operator entering an account number on the first screen, completing the input by then pressing a function key, and, finally, obtaining a screen output that contains the desired account balance.

5250 SNA connectivity

Meridian IVR host communication cells provide the same level of interface for 5250 terminal emulation over SNA that is provided for 3270 emulation.

VT100 connectivity

Meridian IVR host communication cells provide the same level of interface for VT100 terminal emulation through an RS-232 serial interface that is provided for 3270 emulation.

Token Ring connectivity

Meridian IVR host communication cells provide the same level of interface for Token Ring connectivity for 3270 and 5250 terminal emulation.

Other connectivity

Meridian IVR supports Token Ring and Ethernet LAN connectivity (including TCP/IP), and, with a multiport serial I/O card, RS-232 communications.

Use of these data communication packages requires the application developer to write "C" language code as a user function.

Field definitions

Many host programs require field definitions. In these cases, the application developer must find out what these definitions are and build them into customized templates.

Example

A customer needs to enter an account number and a password in order to receive information about his or her account balance. The developer defines these in a template using the field definitions “Account Number” and “Password.” When the customer inputs their account number and password into the IVR system using Dual Tone Multi-Frequency (DTMF), the IVR application program stores each of them in buffers. The input from the buffers is then passed to the host, using the terms “Account Number” and “Password” (through the cells and the template).

Reports

The System Reports interface provides a range of operational and statistical reports. Within report windows, you can see and send to a printer reports that are provided in ASCII format for translation to any database. The following reports are provided with Meridian IVR:

Cell usage Provides statistics on cell access in each application.

Channel usage Provides statistics on channel usage.

Call Detail Provides a record of every call into the system.

Transaction log Provides a log of all internal system events.

Subscriber reports Provide information about incoming calls.

System configuration reports Provide a description of the current system configuration.

Fax reports are also provided with the Meridian IVR Fax Response option.